

FACT SHEET

U.S.E.P.A. Superfund Innovative Technology Evaluation (S.I.T.E.) Demonstration – Ashland, Wisc former Manufactured Gas Plant (MGP) Site

In collaboration with Xcel Energy, EPA will conduct a SITE technology demonstration project at Xcel's former MGP site in Ashland, Wisconsin. Participants in the demonstration include Xcel Energy, EPA Region 5, Wisconsin DNR, EPA's Office of Research and Development's National Risk Management Laboratory (NRML) Cincinnati, Ohio, and EPA's Technology Innovation and Field Services Division (TIFSD) Washington, DC.

The technology to be evaluated is the *Cool-Ox*TM In Situ Chemical Oxidation (ISCO) Process developed and patented by DeepEarth Technologies, Inc., Alsip, Illinois and offered by project teaming partner DCI Environmental, Inc., Savage, MN, the General Contractor. Anticipated demonstration timeframe is Nov 2006-Feb 2007.

Background

Prior to the advent of natural gas pipelines, manufactured gas was the principal means of lighting cities, large and small, around the world. Estimates range from 3000 to as many as 30,000 former manufactured gas plant facilities in the US alone. The Ashland MGP site was in operation from 1885 to 1947.

Byproducts of the gas manufacturing process included petroleum hydrocarbon components such as benzene as well as polynuclear aromatic hydrocarbons (PAHs) also known as tar. In some cases, MGP site owners were able to recycle these byproduct materials, In other cases, wastes were disposed on- and off-site. Benzene and tar contamination have been detected at the Ashland former MGP site, and are the focus of this demonstration.

12-15 former MGP sites such as Ashland have been added to EPA's National Priority List. Many more MGP sites are being addressed under state cleanup programs. The Ashland MGP site was added to the NPL in 2002. To date most MGP cleanup activities have focused on near-surface contamination which could be readily excavated. In recognition of the fact that deeper contamination can both migrate off-site and contribute to contamination of groundwater, recent activities have begun to focus on this problem.

Technology Details

Xcel Energy has proposed to evaluate an in situ chemical oxidation (ISCO) process. The vendor of the technology is DeepEarth Technologies, Inc. The ISCO technology to be used is known as *Cool-Ox*TM Process. In reviewing such proposals, EPA investigates the underlying scientific basis as well as laboratory and field data from applications of this and related technologies.

ISCO is one of the most prevalent technologies currently in use to address deeper subsurface contamination. Despite the extent of use, ISCO has been described by experts as 'developmental' and 'innovative'. A different chemical oxidant has been used at full-scale at least one other former MGP site in Wisconsin, and a pilot-scale project involving activated persulfate was completed at a former MGP in Maryland with promising results. The *Cool-Ox*TM technology is currently undergoing full-scale evaluation at a former MGP site in Illinois. Given promising lab and field results using both *Cool-Ox*TM and other ISCO processes, EPA's SITE program determined that there was sufficient promise to proceed with the demonstration. Field-scale deployments allow evaluation of the ability of the vendor to deliver active agents to achieve adequate contact with the contaminants.

The *Cool-Ox*TM Process relies upon a tailored mixture, an important component of which is an aqueous suspension of solid peroxygen compounds. The vendor claims that this suspension results in a slow, protracted production of hydrogen peroxide. Through a number of chemical reactions, the hydrogen peroxide generates components which attack and destroy the benzene and PAH's. The vendor claims that the Process also

results in the generation of oxygen which enhances the biological degradation of the target contaminants.

The SITE Demonstration

Perhaps the most important aspect of SITE demonstration projects is the additional level of oversight and pre- and post-treatment analysis of all phases of technology implementation. EPA has prepared a detailed Quality Assurance Project Plan (QAPP) covering all aspects of the technology demonstration. The vendor and EPA will operate carefully under detailed Health and Safety Plans.

The SITE demonstration will involve two separate plots. The test objectives in each plot are different. Plot 1 is as far up gradient in terms of groundwater flow as possible. The up gradient location is important in terms of avoiding recontamination following treatment. The objective of the plot 1 demonstration is to evaluate the extent to which the *Cool-Ox*TM Process can attack and destroy contaminants of concern. The evaluation will attempt to distinguish between the chemical oxidation and biodegradation components.

The second plot is in a highly contaminated portion of the site. The *Cool-Ox*TM inventor believes that the process will result in significant increases in the rates of contaminant recovery in three existing product recovery wells. Possible recovery and reuse of these waste materials is of significant interest inasmuch as materials currently being recovered are being utilized for their energy value.

Figure one is a depiction of the *Cool-Ox*TM equipment. Primary components are the tanks containing the chemical oxidation mixture and the injection rigs. Ancillary equipment that will be involved in the demonstration includes a drill rig that EPA will operate on site to collect pre- and post- treatment soil samples.

The anticipated timeframe for the demonstration is Nov 2006 –Feb 2007. Nov-Dec activities will include pre-treatment sampling and the injection of the *Cool-Ox*TM product. Latter stage activities will focus on the measurement of changes in soil and groundwater levels over time.

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Figure 1: Injection Equipment and product tanks

